

JUNG et al. - 10/728,948  
Attorney Docket: 040008-0307076

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously presented) A method of manufacturing a semiconductor device, comprising:
  - forming an insulating layer on a semiconductor substrate;
  - forming a contact hole on the insulating layer;
  - depositing a WSiN layer in the contact hole and on the insulating layer using an atomic layer deposition process, wherein a single atomic layer of the WSiN layer is deposited by a continuous cycle comprising:
    - injecting SiH<sub>4</sub> gas,
    - purging any remaining SiH<sub>4</sub> gas using an inert gas,
    - injecting WF<sub>6</sub> gas,
    - purging the remaining WF<sub>6</sub> gas using an inert gas,
    - injecting NH<sub>3</sub> gas, and
    - purging any remaining NH<sub>3</sub> gas using inert gas;
  - depositing a tungsten layer on the barrier metal using the atomic layer deposition process; and
  - filling the contact hole with a tungsten.
2. (Previously presented) The method of claim 1, wherein the atomic layer deposition process for the WSiN layer and the tungsten layer is performed in a single reaction chamber.
3. (Cancelled).
4. (Original) The method of claim 1, wherein the tungsten is deposited by chemical vapor deposition.
5. (Cancelled).

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6. (Previously presented) The method of claim 1, wherein the WSiN layer has a thickness of 20 to 100Å.
7. (Previously presented) The method of claim 1, wherein the SiH<sub>4</sub> gas is injected at a flow rate of 50~100 SCCM.
8. (Previously presented) The method of claim 1, wherein the WF<sub>6</sub> gas is injected at a flow rate of 10~50 SCCM.
9. (Previously presented) The method of claim 1, wherein the NH<sub>3</sub> gas is injected at a flow rate of 30~80 SCCM.
10. (Original) The method of claim 7, wherein the SiH<sub>4</sub> gas and the WF<sub>6</sub> gas are injected in a ratio of 1:5.
11. (Original) The method of claim 8, wherein the SiH<sub>4</sub> gas and the WF<sub>6</sub> gas are injected in a ratio of 1:5.
12. (Original) The method of claim 2, wherein the tungsten layer is deposited at a temperature of 200 to 600°C.
13. (Original) The method of claim 1, wherein a single atomic layer of the tungsten layer is deposited by a continuous cycle comprising:
  - injecting SiH<sub>4</sub> gas;
  - purging any remaining SiH<sub>4</sub> gas using an inert gas;
  - injecting WF<sub>6</sub> gas; and
  - purging any remaining WF<sub>6</sub> gas using an inert gas.
14. (Original) The method of claim 13, wherein the tungsten layer is deposited to a thickness of 20 to 100Å.
15. (Original) The method of claim 5, wherein the inert gas is any one of Ar gas and a mixture of Ar gas and H<sub>2</sub> gas.

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16. (Original) The method of claim 13, wherein the inert gas is any one of Ar gas and a mixture of Ar gas and H<sub>2</sub> gas.

17-20. (Canceled)